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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DASTOURI, MEHRDAD	
ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/445,304	FUJIEDA, SHIRO	
	Examiner	Art Unit	
	Mehrdad Dastouri	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42 and 48-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42 and 48-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 20, 2004 has been entered.

Response to Amendment

2. Applicant's amendment filed December 20, 2004, has been entered and made of record.

Response to Arguments

3. Applicant's arguments filed December 20, 2004, have been fully considered but they are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5, 7-9, 11, 12, 19-22, 28-34, 48, 49, 51, 52 and 56-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980).

Regarding Claim 1, Mine et al. ("Mine") discloses a gradient calculation means for calculating at least the direction of the level gradient of each of a plurality of

processing units in a given image data including a plurality of pixels, the pixels respectively having level data (Abstract; Figure 1, edge direction unit 16; Figure 12b);

line segment formation means for producing line segment image data representing a line segment for each of the plurality of processing units, each line segment having a given length and direction corresponding to the direction of each level gradient which is calculated by the gradient calculation means (Figure 1, edge magnitude unit 17; Figure 12; Figure 16; Para. 0052-0054, 0059), and

line segment image storage means for storing the line segment image data produced by the line segment formation means (Para. 0059).

Mine further discloses the line segment formation means (edge magnitude unit 17) being arranged and configured to form line segments and calculates the magnitude of the line segment (Para. 0052-0053).

Mine does not explicitly disclose setting a line segment of length "L".

Tsukasaki in the same field of endeavor of edge detection by utilizing gradient vector discloses line segment formation means being arranged and configured to form line segments of length "L" (Para. 0026-0028).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the line segments disclosed by Mine according to the teachings of Tsukasaki to have a length of "L" because it will provide the capability of assigning a predetermined line segment length and limiting the length of the segment (i.e., edge length) to expedite edge detection process (Tsukasaki, Para. 0026)

With regards to Claims 31, 32, 48 and 57, arguments analogous to those presented for Claim 1 are applicable to Claims 31, 32, 48 and 57.

With regards to Claims 28, 33 and 34, arguments analogous to those presented for Claim 1 are applicable to Claims 28, 33 and 34. Mine further discloses display means for displaying input digital images (Figure 1, CRT-display 5). Although Mine does not explicitly teach displaying line segment images, it would have been obvious to one of ordinary skill in the art at the time of the invention to display the line segments disclosed by Mine because it is a fundamental visualization process routinely implemented in computer graphics as a visual aid and is a matter of design choice.

Regarding Claim 2, Mine discloses an image storage means for storing the given image data (Para. 0002).

Regarding Claim 3, Mine discloses an image data extraction means for extracting image data in a processing region set in input image data and feeding the extracted image data to the gradient calculation means (Para. 0002).

Regarding Claim 5, Mine disclose using gray level image data (Para. 0002-0003; Figures 21 and 37. Digital images are either color images, or grayscale or binary images).

Regarding Claims 7, 8 and 9, Mine discloses the gradient calculation means calculates the magnitude of the level gradient in addition to the direction (Para. 0038) and the line segment formation means produces line segment image data having a level corresponding to the magnitude of the level gradient which is calculated by Sobel operator or Prewitt operator (Para. 0052-0054), thereby the gradient calculation means calculate the gradient level only when the magnitude of the level gradient is not less than a predetermined threshold.

Regarding Claim 11, Mine discloses the line segment storage means stores new line segment image data without subjecting the line segment image data to addition processing (Para. 0059).

Regarding Claim 12, Tsukasaki further discloses the line segment formation means produces a line segment having a predetermined length in a direction corresponding to the calculated direction of the level gradient from the position of the processing unit (Para. 0026-0028).

Regarding Claim 19, Mine discloses an image input means having a camera for producing image data and feeding the produced image data to the gradient calculation means (Para. 0002).

Regarding Claims 20-22, 29, and 30, the arguments analogous to those presented above for Claim 28 are applicable to Claims 20-22, 29, and 30. Mine further discloses means for extracting an edge of the image represented by the given image data (Figure 1, edge direction unit 16, edge magnitude unit 17; Figure 12b). It would have been an obvious matter of design choice to display the image represented by the extracted edge either alone or superimposed (overlapped) with the line segment image because it is a well known visualization process routinely implemented in computer graphics as a visual aid.

Regarding Claim 49, Mine discloses detecting a magnitude of the level gradient, thereby a level value, of the line segment image data for each of the plurality of processing units in the given image (Para. 0038, 0052-0054).

Regarding Claims 51 and 52, the arguments analogous to those presented above for Claims 8 and 49 are applicable to Claims 51 and 52, respectively.

Regarding Claim 56, the arguments analogous to those presented above for Claim 1 are applicable to Claim 56. Tsukasaki further discloses means for varying the length "L" prior to forming said line segments (Para. 0026).

Regarding Claim 58, Mine further discloses the line segment image data includes a level (pixel value or intensity which is an inherent characteristic of a pixel, Figures 28 and 29) , and the data stored includes a respective line segment level for at least one line segment passing through a respective pixel (Figures 12b, 17b, 20 and 21).

Regarding Claim 59, the arguments analogous to those presented above for Claim 1 are applicable to Claim 59. Mine further discloses means for selecting between the plurality of image processing (Edge detection may be calculated using Prewtt's or Sobel's operators (Para. 0053-0054)).

Regarding Claim 60, Tsukasaki further discloses means for selecting the direction corresponding to the direction of each level gradient (Abstract, Constitution).

6. Claims 16, 23, 26, 27, 35-41, 50, and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980) and Huang et al. (5,903,660).

Regarding Claims 35 and 16, in addition to the arguments presented for Claim 1, Mine discloses means for extracting a plurality of edges whose level gradients are not less than a predetermined value in the given image data (Para. 0052-0054) and means for setting for each of the edges, a line segment extending a predetermined length in a direction corresponding to the direction of the extracted edge (Para. 0027).

Mine or Tsukasaki does not appear to recognize detecting the presence or absence of a point of intersection of a plurality of line segments and the position thereof.

However, Huang et al. ("Huang") teaches that it is known to detect the presence of a point of intersection of a plurality of line segments (Col. 6, lines 62-67, Col. 7, lines 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the line segments disclosed by Mine to include detection the intersection as taught by Huang because it allows for the detection of the center of a circle as well as the radius.

Regarding Claim 36, Mine discloses the direction of the line segment is a direction perpendicular to the direction of the edge (Figure 12).

Regarding Claim 37, the arguments analogous to those presented above for claims 34 and 35 are applicable to Claim 37. Mine further discloses an image input means for inputting image data representing an inspection object (Para. 0002), and detecting where the line segments are concentrated or overlapped with one another and the position thereof on the basis of the produced line segment image data (Para. 0038, 0092 and 0093).

Regarding Claim 38, Mine discloses the direction corresponding to the direction of the level gradient is the direction of the level gradient (Abstract).

Regarding Claims 39 and 40, the arguments analogous to those presented above for Claims 20 and 21 are applicable to Claims 39 and 40, respectively.

Regarding Claims 23 and 41, the arguments analogous to those presented above for Claims 16 and 28 are applicable to Claims 23 and 41. While Mine and Huang do not appear to recognize displaying a mark at the intersection, it would have been an

obvious matter of design choice because it is a visual aid routinely implemented in computer graphics in order emphasize the location.

Regarding Claims 50 and 53, the arguments analogous to those presented above for Claims 16 and 49 are applicable to Claims 50 and 53.

Regarding Claim 54, the arguments analogous to those presented above for Claim 51 are applicable to Claim 54.

Regarding Claim 55, the arguments analogous to those presented above for Claim 49 are applicable to Claim 55. Mine discloses recognizing coordinates for all processing units on each line segment (Para. 0052-0054).

Regarding Claims 26 and 27, the arguments analogous to those presented above for Claims 21 and 22 are applicable to Claims 26 and 27.

7. Claims 4, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980) as applied to claim 1 above, and further in view of Lin et al. (6,292,582).

Regarding Claim 4, Mine does not disclose a means for setting. However, Lin discloses a means for setting the processing region. The decomposition window 98 or the "processing region" may have a default search pattern (Col. 10, lines 10-11). The search pattern of the processing region may be set by programming (Col. 10, lines 54-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the processing region disclosed by Mine and Tsukasaki to include a means for setting as taught by Lin, because it is well known in the art and provides the user the ability to determine the processing region or region of interest.

Regarding Claim 10, Mine does not appear to recognize adding the new line segment to the line segment image data already stored at each pixel. However, Lin teaches that it is known to include a storage means that appends or "adds" new image data to data already stored at each of the pixels (Col. 15, lines 59-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the storage disclosed by Mine and Tsukasaki to include adding the image data as taught by Lin because it is well known in the art and would be an obvious matter of design choice.

8. Claims 13-15 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980) as applied to claim 1 above, and further in view of Tachibana (5,898,440).

Regarding Claim 13, Mine does not appear to recognize giving the distance from the position of the processing unit to an initial point and the distance from the processing unit to an initial point and the distance from the processing unit to a terminal point. Tachibana teaches that it is known to have a line segment formation means that produces a line with given parameters (Col. 5, line 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the line segment formation disclosed by Mine and Tsukasaki to include given parameters as taught by Tachibana thereby including a predetermined length and a distance from the processing unit to an initial point and a terminal point in order to form line segments of a specified length because it is well known in the art and would be an obvious matter of design choice.

Regarding Claims 14 and 15, the arguments analogous to those presented above for Claim 13 are applicable to claims 14 and 15. Note that allowing for given parameters (Col. 5, line 7) is a means for setting.

9. Claims 17, 18, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980) as applied to Claim1 above, and further in view of King et al. (5,926,557).

Regarding Claims 17, 18, 24, and 25, Mine discloses an image processing apparatus that has line segment image data stored in line segment image storage means (Para. 0059). Mine does not recognize the need for detecting the position of the pixel having the maximum of the levels of the line segment image data.

However, King et al. ("King") teaches a means for detecting the position of the pixel having the maximum gradient (Col. 11, lines 2-7). King discloses a means for judging whether or not the maximum level exceeds a predetermined threshold (Figure 9, element 320).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image apparatus as disclosed by Mine and Tsukasaki to use the means for detecting the position of the pixel having the maximum gradient, as taught by King, in order to detect the position of the pixel having the maximum of the levels of the line segment image data stored in the line segment image storage means. King indicates the pixel that has the maximum level with a mark as shown in Figure 6 by elements 76a-76d. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have displayed the mark

indicating the pixel with the maximum level as disclosed by King superimposed or "overlapped" with the image, as taught by Mine, in order to clearly illustrate the mark.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828) in view of Tsukasaki (JP 08-272980) as applied to Claim 1 above, and further in view of Williams et al. (6,427,030).

Regarding Claim 6, Mine does not appear to recognize producing line segment image data at a binary level. However, Williams et al. ("Williams") teaches that it is known to convert gray level pixel image data to binary level pixel image data (Col. 1, lines 30-34).

Therefore, it would have been obvious to one of ordinary skill to have modified the line segment formation means as disclosed by Mine and Tsukasaki to produce line segment image data at a binary level, as taught by Williams, in order to reduce the multi-level gray image data to a limited number of levels so that it requires less processing time and it is printable by a standard printer (Col. 1, lines 26-28).

11. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mine et al. (JP 09-054828), Tsukasaki (JP 08-272980) and Huang et al. (5,903,660) as applied to Claim 37 above, and further in view of Tachibana (5,898,440).

Regarding Claim 42, the arguments analogous to those presented above for Claims 14 and 15 are applicable to claim 42.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703)

305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEHRDAD DASTOURI
PRIMARY EXAMINER

Mehrdad Dastouri
Primary Examiner
Art Unit 2623
March 5, 2005